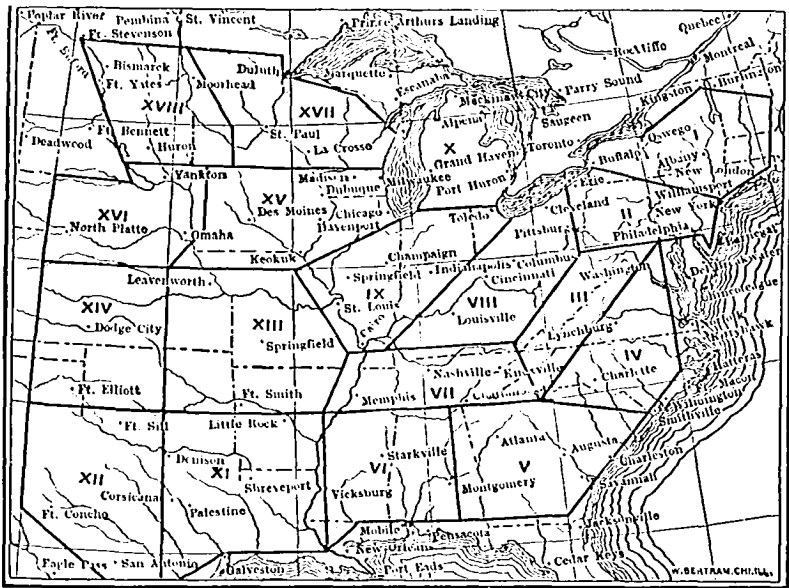


## TORNADO PREDICTIONS.

The study of the daily weather maps, for the purpose of determining the conditions favorable for the development of tornadoes, has received special attention during the past few months.

In preparing for the work of making tornado predictions it was

## DISTRICTS FOR TORNADO PREDICTIONS.



necessary to ascertain as nearly as possible the limits of that portion of the United States within which tornadoes were likely to occur. Within this territory there are tornado belts or limited regions where tornadoes are of frequent occurrence, the limits of which were determined by the geographical distribution of tornadoes as taken from the records of 90 years. Each district is sub-divided by imaginary lines into four equal parts and predictions are made either for the entire district or for any one or more of these parts.

Tornadoes being remarkably local disturbances, the area for which predictions are made on any one day should be as limited as possible.

The accompanying map shows the territory for which predictions have been made and the locations and adopted numbers of the various tornado districts.

With additional data to complete the tornado records of past years it is believed that hereafter the above districts may be located more advantageously. Regular tornado predictions were commenced experimentally on the 10th of March, 1884, and during the remainder of that month were made twice daily at intervals of eight hours. The first prediction was made from the morning (7 A. M. Washington time) weather map and covered the eight hours up to 3 P. M. The second prediction was made from the afternoon (3 P. M. Washington time) weather map and covered the eight hours up to 11 P. M.

During April the same plan was pursued.

For the month of May the first prediction was made from the morning weather map and covered the sixteen hours up to 11 P. M. The second prediction was made from the afternoon map and covered the eight hours up to 11 P. M. The eight hour predictions for May were made in order to show the comparative value for study of the morning and afternoon weather maps. The number and character of predictions and the percentages of verifications for the above months are given in the accompanying tables.

TABLE NO. I.  
*Tornado Predictions and Verifications.*

MONTH.	Predictions for	Total number.	Number of predictions "favorable for tornadoes."	Fully verified.	Number of predictions "unfavorable for tornadoes."	Fully verified.	Total number made.	Total number fully verified.
March .....	8 hours	771	43	6	728	721	771	727
April .....	8 hours	934	25	11	909	906	934	917
May .....	8 hours	558	10	8	548	542	558	550
May .....	16 hours	549	22	3	518	511	549	514

TABLE NO. II.

*Percentage of Tornado Predictions.*

DISTRICTS.	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.	XII.	XIII.	XIV.	XV.	XVI.	XVII.	XVIII.	GENERAL AVERAGE PERCENTAGE.
March..... Eight hour predictions	100.00	98.86	95.46	88.53	95.92	92.56	88.53	87.86	89.10	100.00	93.30	100.00	91.32	100.00	99.43	100.00	100.00	100.00	95.61
April .. Eight hour predictions	100.00	100.00	100.00	95.28	96.22	95.28	100.00	98.11	99.04	98.11	99.01	100.00	94.07	100.00	98.08	100.00	100.00	100.00	98.51
May..... Eight hour predictions	100.00	100.00	100.00	100.00	100.00	100.00	100.00	96.77	96.77	96.77	100.00	100.00	95.16	96.77	96.77	96.77	100.00	100.00	98.65
May..... Sixteen hour predictions	100.00	100.00	100.00	95.16	98.39	98.39	96.77	90.32	88.71	96.77	93.10	100.00	82.50	100.00	97.07	100.00	100.00	100.00	96.54

NOTE.—As shown in table No. 1 the number of predictions for any month is determined by multiplying the whole number of tornado districts by the product of the number of days in a month and the number of times of daily predictions for that month. From this result is subtracted the number of blanks, viz., the number of times when predictions could not be made for one or more districts, owing to the absence of reports. In tables Nos. I and II the results of the 7 A. M. and 3 P. M. predictions are combined for the months of March and April, while for the month of May they are considered separately, for reasons before given.

By an examination of table No. I. it will be seen that the predictions are of a dualistic character; (1) those favorable for tornadoes, (2) those unfavorable for tornadoes. Both are positive predictions, and it requires as much, and often more, study to say that no tornadoes will occur as to make the prediction that conditions are favorable for their development.

From the 1st of March to the 1st of November the daily weather maps require close and constant study, and in this connection it is hardly necessary to say that the atmospheric conditions incident to the formation of local disturbances, such as tornadoes, hail storms and hurricanes, are not as readily discovered as in the case of more general changes.

It is important to state that the test of complete verification of any prediction was determined by the appearance or non-appearance of the characteristic funnel shaped cloud in the region for which the prediction was made. In no instance where it was predicted that conditions were favorable for the development of tornadoes did violent storms fail to occur, either hail, hurricanes or tornadoes. In many cases the winds were very destructive to life and property, more particularly the latter, but the predictions were not counted as successful tornado predictions unless the funnel-shaped cloud was actually reported as a feature of the storm. No prediction of conditions favorable to tornadoes was counted a success unless the tornado's path was clearly within the region or district for which the prediction was made and occurred within the eight or sixteen hours specified.

The reports from all districts are not yet complete, and from many localities none will be received except, perhaps, at a very late day. The number of tornado reporting stations, now over 800, is too few to properly cover the territory for which predictions are made and from which regular reports should be received.

Tornadoes are extremely local disturbances; in many cases the funnel-shaped cloud, although perfectly formed, does not reach the earth, but remains at a considerable elevation like a captive balloon, being attended by hail and gusts of wind. In such cases the damage done by the wind is often not attributed to a tornado, although the latter really exists.

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